Complete Summary

GUIDELINE TITLE

Evidence based clinical practice guidelines for the infant with bronchiolitis.

BIBLIOGRAPHIC SOURCE(S)

Cincinnati Children's Hospital Medical Center. Evidence based clinical practice guideline for infant with bronchiolitis. Cincinnati (OH): Cincinnati Children's Hospital Medical Center; 2001 Nov 28. 9 p. [82 references]

COMPLETE SUMMARY CONTENT

SCOPE

DISEASE/CONDITION(S)

Bronchiolitis

GUIDELINE CATEGORY

Diagnosis
Evaluation
Management

CLINICAL SPECIALTY

Emergency Medicine
Family Practice
Internal Medicine
Pediatrics

INTENDED USERS

Advanced Practice Nurses
Nurses
Physician Assistants
Physicians
Respiratory Care Practitioners

GUIDELINE OBJECTIVE(S)

To provide a practical, evidence based approach to the diagnosis and management of acute bronchiolitis in infants less than one year of age

TARGET POPULATION

These guidelines are intended for use in the following types of patients:

- Ages less than 12 completed months and admitted for the first time episode with bronchiolitis typical in its presentation and clinical course

These guidelines are not intended for use in the following types of bronchiolitis patients:

- Patients with a history of cystic fibrosis (CF)
- Patients with a history of Bronchopulmonary dysplasia (BPD)
- Patients with immunodeficiencies
- Patients admitted to an intensive care ward
- Patients requiring ventilator care
- Patients with other severe comorbid conditions complicating care

INTERVENTIONS AND PRACTICES CONSIDERED

Prevention

1. Respiratory and contact isolation precautions for patients with documented respiratory syncytial virus (RSV) infections
2. Review of preventive measures with parents of newborns

Diagnosis

1. Clinical assessment, including signs, symptoms and history
2. Laboratory and radiological studies (i.e., respiratory syncytial virus (RSV) swab, chest X-rays, cultures of blood or urine, capillary or arterial blood gases, pulse oximetry, nasopharyngeal washing) are considered but are not generally helpful

Management

1. Medications
    - Oxygen therapy
    - Scheduled or serial use of bronchodilator aerosol therapies only if improvement is documented
    - Inhalations using epinephrine as a trial therapy

Note: Antibiotics are not recommended in the absence of an identified bacterial focus; Antihistamines, oral decongestants and nasal vasoconstrictors are not recommended for routine therapy; Steroid therapy given as inhalations, intravenously (IV), orally (PO), or intramuscularly (IM) is not recommended.

2. Respiratory care therapies
    - Suctioning
    - Normal saline drops prior to suctioning

    Note: The following routine respiratory care therapies are considered but not recommended: chest physiotherapy, cool mist therapy, aerosol therapy with saline.

3. Monitoring of clinical status
    - Repeated clinical assessments
    - Selective monitoring of mechanical heart rate, respiratory rate, oxygen saturation, pulse oximetry
4. Parent education
    - Basic pathophysiology and expected clinical course of bronchiolitis
    - Proper techniques for suctioning and airway maintenance
5. Discharge planning

MAJOR OUTCOMES CONSIDERED

- Effect on clinical status
- Improvement in clinical appearance
- Hospitalization rates
- Length of stay

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Searches of Electronic Databases

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

Not stated

NUMBER OF SOURCE DOCUMENTS

Not stated

METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Weighting According to a Rating Scheme (Scheme Given)

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Evidence Based Grading Scale:
A: Randomized controlled trial: large sample
B: Randomized controlled trial: small sample
C: Prospective trial or large case series
D: Retrospective analysis
E: Expert opinion or consensus
F: Basic laboratory research
S: Review article
M: Meta-analysis
Q: Decision analysis
L: Legal requirement
O: Other evidence
X: No evidence

METHODS USED TO ANALYZE THE EVIDENCE

Review
Review of Published Meta-Analyses

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

The recommendations contained in this document were formulated by a working group that included community and hospital based physicians, nurses, respiratory therapists, and others, who examined current local clinical practices and performed extensive and critical literature reviews using a grading scale.

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Expert Consensus

DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS

The recommendations contained in this document were formulated by a working group that included community and hospital based physicians, nurses, respiratory therapists, and others, who examined current local clinical practices and performed extensive and critical literature reviews.

During formulation of these guidelines, the committee members have remained cognizant of controversies and disagreements over the management of these patients. They have tried to resolve controversial issues where possible and, when not possible, to offer optional approaches to care in the form of information that includes best supporting evidence of efficacy for alternative choices.

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Not applicable

COST ANALYSIS

A formal cost analysis was not performed and published cost analyses were not reviewed.

METHOD OF GUIDELINE VALIDATION

Internal Peer Review

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

The guidelines have been reviewed and approved by senior management, Risk Management and Corporate Compliance, the Institutional Review Board, the hospital's Pharmacy and Therapeutics, Clinical Practices, Executive and other committees, and other individuals as appropriate to their intended purposes.

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

Each recommendation is followed by evidence grades (A-X) identifying the type of supporting evidence. Definitions of the evidence grades are presented at the end of the Major Recommendations field.

Prevention

1. It is recommended, in patients with documented respiratory syncytial virus (RSV) infections, that masks covering the nose and eyes be worn and that contact isolation, including vigorous handwashing, be performed before and after entering the exam room (Hall et al., 1981 [C]; Hall, 2001 [S]; Local Expert Consensus [E]).
2. It is recommended that preventive measures be reviewed with parents of newborns prior to discharge from the hospital and at follow-up visits in the first years of life.

General

The basic management of typical bronchiolitis is anchored in the provision of therapies that assures that the patient is well oxygenated and well hydrated. The main benefits of hospitalization of infants with acute respiratory syncytial virus infections are the careful monitoring of clinical status, maintenance of a patent airway (through positioning, suctioning and mucus clearance), maintenance of adequate hydration, and parental education (Klassen, 1997 [S]; Lugo & Nahata, 1993 [S]; Panitch, Callahan, & Schidlow, 1993 [S]; Nicolai & Pohl, 1990 [S]; Local Expert Consensus [E]).

Clinical Assessment

Bronchiolitis is a clinical diagnosis. Infants with acute bronchiolitis may present with a wide range of clinical symptoms and severity from mild upper respiratory infections (URI) to impending respiratory failure.

Diagnostic criteria for bronchiolitis include, but are not limited to, the following:

1. preceding upper-respiratory illness and/or rhinorrhea
2. signs of respiratory illness which may include the following common upper respiratory infection symptoms:
    - wheezing
    - retractions
    - shortness of breath
    - low O_2 saturation
    - tachypnea
    - color change
    - nasal flaring
3. signs of dehydration
4. exposure to persons with viral upper respiratory infection

The diagnosis of bronchiolitis and its severity is rooted in the clinician's interpretation of the constellation of characteristic findings and is not dependent on any specific clinical finding or diagnostic test (Evidence Grade E).

Laboratory and Radiological Studies

Routine laboratory studies (respiratory syncytial virus [RSV] swab, chest X-rays, cultures, capillary or arterial blood gases) to determine respiratory syncytial virus status or to rule out infants with serious bacterial infection are not generally helpful and may result in increased rates of unnecessary admission, further testing, and unnecessary therapies (Kuppermann et al., 1997 [C]; El-Radhi, Barry, & Patel, 1999 [D]; Liebelt, Qi, & Harvey, 1999 [D]).

> Note 1: A routine nasopharyngeal washing to determine the presence of the RSV (respiratory syncytial virus) antigen is not recommended (Kuppermann et al., 1997 [C]; El-Radhi, Barry, & Patel, 1999 [D]; Liebelt, Qi, & Harvey, 1999 [D]; Antonow et al., 1998 [D]; Schwartz, 1995 [S]; Chiocca, 1994 [S]; Lugo & Nahata, 1993 [S]; Stark & Busse, 1991 [S]).
>
> Note 2: Chest X-rays are not routinely recommended and may be obtained only as clinically indicated when the diagnosis of bronchiolitis is not clear (Swingler, Hussey, & Zwarenstein, 1998 [C]; El-Radhi, Barry, & Patel, 1999 [D]; Roback & Dreitlein, 1998 [D]).
>
> Note 3: Culture of blood and urine for bacteria in uncomplicated bronchiolitis is not recommended (Kuppermann et al., 1997 [C]; Liebelt, Qi, & Harvey, 1999 [D]).
>
> Note 4: Capillary or arterial blood gases and pulse oximetry are recommended only as clinically indicated for individual patients (Evidence Grade E).

Medications

1. Oxygen therapy is frequently required in the treatment of bronchiolitis. It is recommended that oxygen saturation monitoring be utilized to maintain blood oxygen levels within a normal range. This range is variable in definition and

patient specific. Adequate arterial oxygen levels are achieved when the oxygen saturation is between 90 and 94%. Therefore, starting supplemental oxygen when the saturation is consistently less than 91% and weaning oxygen when higher than 94% is considered reasonable (National Institutes of Health [NIH], 1997 [E]).

Note: See Monitoring section below for recommendation regarding oxygen saturation monitoring.

2. Scheduled or serial use of bronchodilator aerosol therapies is not recommended unless there is a documented clinical improvement response from a given patient (Flores & Horwitz, 1997 [M]; Kellner et al., 1996 [M]; Dobson et al., 1998 [A]; Goh et al., 1997 [A]; Chowdhury et al., 1995 [A]; Klassen et al., 1991 [A]; Gadomski et al., 6-1994 [B]; Wang et al., 1992 [B]; Ho et al., 1991 [B]; Lugo, Salyer, & Dean, 1998 [C]; Lenney & Milner, 1978 [D]; Rubin & Albers, 1996 [S]).

   Note: See Respiratory Care Therapy section below regarding the importance of suctioning before any inhalation therapy.

3. Inhalations using epinephrine as a trial therapy may be considered (Menon, Sutcliffe, & Klassen, 1995 [B]; Sanchez et al., 1993 [B]; Lenney & Milner, 1978 [D]; Klassen, 1997 [S]).
4. Because deterioration has been associated with inhalation therapies (Ho, et al., 1991 [B]), if, between 15-30 minutes (Klassen, 1997 [S]; Bausch and Lomb Pharmaceuticals, Inc., 1999 [O]) after a trial inhalation therapy, there is no significant improvement in clinical appearance, it is recommended that the therapy not be continued nor be repeated. (In order to determine appropriateness of repeated therapy, use the Respiratory Assessment/Care Record in the guideline document to record pre- and post-evaluation score)(Local Expert Consensus [E]).
5. Antibiotics are not recommended in the absence of an identified bacterial focus (Friis et al., 1984 [B]; Kuppermann et al., 1997 [C]; Liebelt, Qi, & Harvey, 1999 [D]; Antonow et al., 1998 [D]; Heikkinen, Thint, & Chonmaitree, 1999 [C]; Andrade et al., 1998 [C]; Pitkaranta et al., 1998 [C]; Glasziou et al., 2000 [M]; Del Mar, Glasziou, & Hayem, 1997 [M]).
6. Antihistamines, oral decongestants and nasal vasoconstrictors are not recommended for routine therapy (Clemens et al., 1997 [B]; Hutton et al., 1991 [B]; American Academy of Pediatrics [AAP], 1997 [S]; AAP, 1978 [S]; Gadomski & Horton, 1992 [O]; Kernan et al., 2000 [D]).
7. Steroid therapy given as inhalations, intravenously (IV), orally (PO), or intramuscularly (IM) is not recommended due to a lack of effect on clinical status or on absolute length of stay (LOS) in the hospital (Garrison et al., 2000 [M]; Cade et al., 2000 [A]; Richter & Seddon, 1998 [A]; De Boeck et al., 1997 [A]; Klassen et al., 1997 [A]; Roosevelt et al., 1996 [A]; Lugo & Nahata, 1993 [S]; Panitch, Callahan, & Schidlow, 1993 [S]).

Respiratory Care Therapies

1. It is recommended the infant be suctioned before feeding, PRN and prior to each inhalation therapy (Evidence Grade E).

In order to appropriately measure improvement in clinical status due to the therapeutic effects of the medication, the following reasons for suctioning are considered:

- Suctioning itself may improve respiratory status such that inhalation therapy is not necessary. Thus, it is important to document the pre- and post-suction score.
- Suctioning may improve the delivery of the inhalation treatment (Evidence Grade E).

Normal saline nose drops may be used prior to suctioning (Evidence Grade E).

2. Other routine respiratory care therapies are not helpful and are not generally recommended.

   Note 1: Chest physiotherapy (CPT) is not recommended (Nicholas et al., 1999 [B]; Webb et al., 1985 [E]).

   Note 2: Cool mist therapy is not recommended (Gibson, 1974 [E]).

   Note 3: Aerosol therapy with saline is not recommended (Chowdhury et al., 1995 [A]; Gadomski et al., 1994 [A]; Ho et al., 1991 [B]).

Monitoring

Repeated clinical assessment is the most important aspect of monitoring for worsening respiratory status. Mechanical heart rate, respiratory rate and oxygen saturation monitoring devices provide useful additional clinical data, but may also increase length of stay and impede a patient's transition to home.

1. Consider cardiac and respiratory rate monitoring in hospitalized patients during the acute stage of bronchiolitis when the risk of apnea and/or bradycardia is greatest. When the patient has demonstrated pulse and respiratory rate stability, discontinue monitoring (Evidence Grade E).
2. It is recommended that scheduled spot checks of pulse oximetry be utilized in infants with bronchiolitis as opposed to continuous pulse oximetry (Evidence Grade E).

Parent Education

1. Educate parents on the basic pathophysiology and expected clinical course of bronchiolitis.

   Note: The median duration of illness for children <24 months with bronchiolitis is 12 days; after 21 days approximately 18% will remain ill, and after 28 days 9% will remain ill (Swingler, Hussey, & Zwarenstein, 2000 [C]).

2. Educate parents on the proper techniques for suctioning and airway maintenance (Evidence Grade E).

3. Educate parents about when to call their health care provider by explaining the signs of worsening clinical status (Evidence Grade E):
    - increasing respiratory rate and work of breathing as indicated by accessory muscle use
    - inability to maintain adequate hydration
    - worsening general appearance

Discharge Criteria

Note: Begin discharge planning on admission.

Respiratory Status

- Respiratory rate usually <70/min and baby relatively comfortable.
- Parent can clear the infant's airway using bulb suctioning.
- Patient is either: on room air, or has been on stable oxygen therapy that is at a level considered consistent with being able to effectively continue the therapy at home.

Nutritional Status

- The patient is on oral feedings at a level to prevent dehydration.

Treatment Modalities

- The patient is on oral medications or regularly administered parenteral agents.

Social

- Home resources are adequate to support the use of any necessary home therapies.
- Parent or guardian is proficient with therapies required.
- Family has participated in the processes leading to the discharge decisions.

Follow-up

- When indicated, home care and durable medical supply (DMS) agencies have been notified and arrangements for visits finalized.
- Any primary care provider(s) and home health care identified, notified, and agree(s) with discharge decision, and follow-up appointments have been scheduled.

Definitions

Evidence Based Grading Scale:

A: Randomized controlled trial: large sample
B: Randomized controlled trial: small sample
C: Prospective trial or large case series
D: Retrospective analysis
E: Expert opinion or consensus
F: Basic laboratory research
S: Review article
M: Meta-analysis
Q: Decision analysis
L: Legal requirement
O: Other evidence
X: No evidence

CLINICAL ALGORITHM(S)

None provided

EVIDENCE SUPPORTING THE RECOMMENDATIONS

REFERENCES SUPPORTING THE RECOMMENDATIONS

References open in a new window

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The type of supporting evidence is identified for each recommendation (see "Major Recommendations").

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

Appropriate medical management of infants less than one year of age with a first time episode of bronchiolitis. Several studies of the use of clinical guidelines for the management of infant bronchiolitis have shown a reduction in unnecessary resource utilization with a streamlining of medical care for these infants.

The main benefits of hospitalization of infants with acute respiratory syncytial virus infections are the careful monitoring of clinical status, maintenance of a patent airway (through positioning, suctioning and mucus clearance), maintenance of adequate hydration, and parental education.

Subgroups Most Likely to Benefit:

Infants at particular risk of severe complications from respiratory syncytial virus (such as premature infants, infants with underlying chronic conditions, and infants less than three months of age) are most likely to benefit from monitoring of clinical status during hospitalization.

POTENTIAL HARMS

Deterioration has been associated with inhalation therapies.

Although mechanical heart rate, respiratory rate and oxygen saturation monitoring devices provide useful clinical data, they may also increase length of stay and impede a patient's transition to home.

QUALIFYING STATEMENTS

QUALIFYING STATEMENTS

These recommendations result from review of literature and practices current at the time of their formulations. This protocol does not preclude using care modalities proven efficacious in studies published subsequent to the current revision of this document. This document is not intended to impose standards of care preventing selective variances from the guidelines to meet the specific and unique requirements of individual patients. Adherence to this pathway is voluntary. The physician in light of the individual circumstances presented by the patient must make the ultimate judgment regarding the priority of any specific procedure.

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

An implementation strategy was not provided.

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

Getting Better

IOM DOMAIN

Effectiveness
Patient-centeredness

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

Cincinnati Children's Hospital Medical Center. Evidence based clinical practice guideline for infant with bronchiolitis. Cincinnati (OH): Cincinnati Children's Hospital Medical Center; 2001 Nov 28. 9 p. [82 references]

ADAPTATION

Not applicable: The guideline was not adapted from another source.

DATE RELEASED

1996 Dec 6 (updated 2001 Nov 28)

GUIDELINE DEVELOPER(S)

Cincinnati Children's Hospital Medical Center - Hospital/Medical Center

SOURCE(S) OF FUNDING

Cincinnati Children's Hospital Medical Center

GUIDELINE COMMITTEE

Committee on Bronchiolitis, 2001

COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE

Bronchiolitis Team Members, 2001:

Community Physician: Chris Bolling: Chair

Children's Hospital Medical Center Physicians: Michael Farrell; Scott Reeves

Nursing/Patient Services: Shirley Salway

Respiratory Therapy: Scott Pettinichi; Ed Conway

Other Services: Uma Kotagal; Kieran Phelan; Mary Pat Alfaro; Eloise Clark; Wendy Gerhardt; Mindy Muenich; Kate Rich

Ad Hoc Advisory: Beverly Connelly; Richard Ruddy; Irwin Light; Mike McKibben; Kathy Latta; Dorine Seaquist; Elizabeth Stautberg; Barbarie Hill

FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

Not stated

GUIDELINE STATUS

This is the current release of the guideline.

This guideline replaces a previously released version [Cincinnati (OH): Children's Hospital Medical Center (CHMC); 1998. 16 p.]

GUIDELINE AVAILABILITY

Electronic copies: Available from the Cincinnati Children's Hospital Medical Center.

For information regarding the full-text guideline, print copies, or evidence-based practice support services contact the Children's Hospital Medical Center Health Policy and Clinical Effectiveness Department at HPCEInfo@chmcc.org.

AVAILABILITY OF COMPANION DOCUMENTS

The following are available:

- Bronchiolitis clinical guideline admission orders. Cincinnati (OH): Children's Hospital Medical Center, 1999 Nov. 1 p.
- Bronchiolitis education record. Cincinnati (OH): Children's Hospital Medical Center, 2001 Dec. 2 p.
- Bronchiolitis discharge instructions. Cincinnati (OH): Children's Hospital Medical Center, 2001 Dec. 1 p.
- Bronchiolitis clinical pathway. Cincinnati (OH): Children's Hospital Medical Center, 2002 Jan. 4 p.

For information contact the Children's Hospital Medical Center Health Policy and Clinical Effectiveness Department at HPCEInfo@chmcc.org.

PATIENT RESOURCES

The following are available:

- Bronchiolitis. Cincinnati (OH): Cincinnati Children's Hospital Medical Center, 2001 Nov. 4 p.

Electronic copies: Available from the Cincinnati Children's Hospital Medical Center Web site.

- Bronchiolitis -- Essential facts. Cincinnati (OH): Cincinnati Children's Hospital Medical Center, 2001. 2 p.

Electronic copies: Available from the Cincinnati Children's Hospital Medical Center Web site.

Please note: This patient information is intended to provide health professionals with information to share with their patients to help them better understand their health and their diagnosed disorders. By providing access to this patient information, it is not the intention of NGC to provide specific medical advice for particular patients. Rather we urge patients and their representatives to review this material and then to consult with a licensed health professional for evaluation of treatment options suitable for them as well as for diagnosis and answers to their personal medical questions. This patient information has been derived and prepared from a guideline for health care professionals included on NGC by the authors or publishers of that original guideline. The patient information is not reviewed by NGC to establish whether or not it accurately reflects the original guideline's content.

NGC STATUS

This summary was completed by ECRI on September 1, 1998. The information was verified by the guideline developer on December 1, 1998. This summary was most recently updated on January 14, 2002. The updated information was verified by the guideline developer as of February 26, 2002.

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